"Kids on campus"
Optimal learning environments in Japan

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March 2005

LEGO® learning institute

Abstract

At Saitama University, a few elementary schools and a growing number special afternoon schools in Japan, a new, exciting concept for "optimal learning" is being developed. In this article researcher, Frans Ørsted Andersen from the Danish University of Education (www.dpu.dk) calls this concept "kids on campus" – a name Mr. Masao Ishihara, Japanese educational consultant and conductor of these teaching sessions, uses for some of the "optimal learning" activities. Thus the term "kids on campus" is covering a variety of learning programmes for children of all ages (3 to 13) in different Japanese institutions.

The programmes also has something to offer the university students involved, who get a chance to practice, rehearse, communicate, "turn around" and reflect on their knowledge and coming profession, often in "alternative ways" when confronted with the "undisciplined" questions and solutions offered by children.

At the core of the new concept is a kind of collaborative learning setup where pupils (children participating in these activities) and teachers (mainly university students) both learn and develop. Traditional educational roles change dynamically during the learning process, "flow" periods are frequent and conflicts, boredom or performance pressures seldom. Another achievement of these "optimal learning environments" could be described as "action competence", a construct that deals with achieving "deep" knowledge going beyond mere reproduction and memorizing, and which has learning perspectives involving creativity, innovation and an expanded understanding of problems (here technical / scientific), their causes, effects and solutions. Obtaining "action competence" can also be linked to "flow"-processes.

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IT-class at Keio Yochisha Elementary School

It's a Tuesday afternoon in the crisp Japanese winter. A group of 10-12 year old kids from Keio Yochisha Elementary[1] is entering a futuristic,

1 www.yochisha.keio.ac.jp

2 Mr. Masao Ishihara runs an educational, consultative business of his own. Check it out at: www.mdstorm.com

3 At www.legolearning.net you can read more about Mihaly Csikszentmihalyi and "flow" in the article "Mihaly Csikszentmihalyi – creator of the flow theory".

inspiring, un-even shaped – and yet very child centered – classroom for nearly two hours of voluntary cross-curricular IT-class that goes on for a year, every Tuesday at this time. "Manga" and soccer posters on the wall mingle with flow charts, children's drawings and other standard classroom wall decorations like white boards, timetables and announcements for meetings.

Otherwise the classroom is completely unlike anything I have ever seen. The room itself is kind of pentagonal shaped – shelves and boxes of computer hard- and software and all kinds of electronic gear and gadgets are piled along the walls. Spread all over the floor are boxes of Lego bricks – mostly – from series like Lego Technic, Mindstorms and Robolab. In one corner there's a huge open circle on the floor – reserved for concrete tests, experiments and rounds of ordinary play with computer controlled vehicles and robots.

In another corner we find a rectangular shaped racing and "maze" field for exercising devices for "Lego First League" – a robots invention scheme designed by Lego Educational Division for schools. All in all a very inspiring and well fit room for creating an "optimal learning environment".

The rest of the classroom has huge, very low, square shaped tables on wheels with several laptops on the plate. The children eagerly enter this "Merlin's cave" of a classroom. Some sit down on the carpeted floor, at the low laptop-tables, ready to continue, in groups or individually, with the projects they left behind last time. Others go to the boxes of concrete construction material.

They all seem to be very dedicated to and engaged in the activities – and without any instruction they themselves start finding their files on the computers or look around for concrete construction tools and bits. No need for the teachers to give them any orders or messages at this stage.

4 Rathunde, K. (2003): A Comparison of Montessori and Traditional Middle Schools: Motivation, Quality of Experience, and Social Context. In "The Natma Journal", Vol. 28, No.3, Summer 2003.

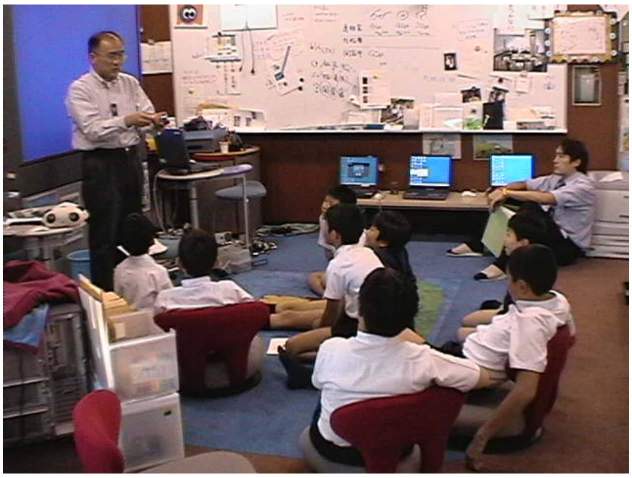
5 LEC = Lego Educational Centers. You can read more about the LEC classes in Japan at www.legoeducation.jp

6 Bjarne Bruun Jensen, researcher at the Danish University of Education, www.dpu.dk. He is also a consultant for the WHO within the fields of Health Education and Health Promotion. He describes the mentioned model in "Participation, Commitment and Knowledge as Components of Pupils' Action Competence" in Critical Environmental and Health Education Research Issues and Challenges (2000), Published by the Danish University of Education, Copenhagen.

7 www.legoeducation.jp/locations/jiyuugaoka.html

After a while, Mr. Masao Ishihara[2], one of the IT-teachers and educational consultant of the whole concept, gathers the children on the mentioned floor circle and, while using the whiteboard and a robot piece, starts explaining and discussing some basic scientific and technological principles with them concerning their ongoing robot-projects.

Traditional teacher-student teaching only lasts for about 10 minutes – then the children return to their own projects, that deal with both logical problem solving, computer programming and concrete constructing.



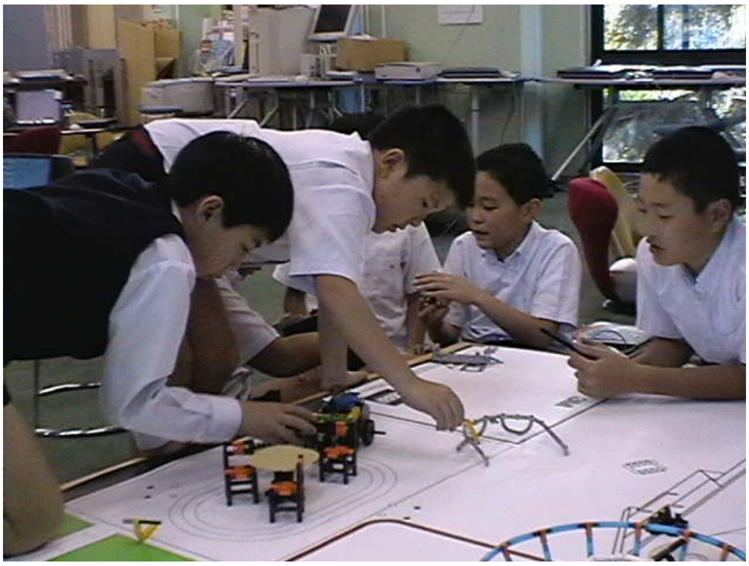
This session of more traditional teacher-student teaching and interacting only lasts for about 10 minutes – then the children return to their own projects, that deal with both logical problem solving, computer programming and concrete constructing. Their ways of learning involve a variety of intermingled methods: listening to teacher instruction, collaborative teacher-student or student-student discussions, individual reflection, trial-and-error practice and all sorts of computer, manual or concrete material mediated learning.

The children keep changing their physical placement in the room – moving freely around from group discussions, robot construction on the floor, teacher-student whiteboard sessions like the one mentioned, testing and playing periods at the robot "maze" field (shown at picture above) or programming at the laptops.

Thus, with a variety of learning possibilities at hand, their ways of learning change accordingly with both cognitive (experimenting, "trial and error", reflecting, etc.), emotional (engagement, flow, expanding the "self", etc.) and social (discussing, helping each other, playing) elements.

A special feature is the involvement of teacher assistants – students who engage in the IT-class as a way of perhaps earning extra money

and / or to learn and practice themselves. All in all you could describe this IT-class as a good example of "project work learning" – a way of learning that achieves more than just mere reproduction and memorizing of standard curriculum knowledge. A way of learning that can lead to "flow" and "action competence", involving advanced problem solving, innovation and creative thinking.



But what is "flow" and "action competence"?

A "flow" environment

By using a construct developed by the American researcher, Mihaly Csikszentmihalyi, "*flow*"[3] is a unique, enjoyable, worth-while psychological state of continual and committed attention:

'Flow' is a task-focused and motivating experience, triggered by a good fit between a person's skills and their environment.

"Flow is an intrinsically motivated, task-focused state characterized by full concentration, a change in the awareness of time, feelings of clarity and control, a merging of action and awareness and a lack of self-consciousness. The experience is triggered by a good fit between a person's skills in an activity and the challenges afforded by the environment. Flow has been shown to promote learning and development because experiences of total concentration are intrinsically rewarding, and they motivate students to repeat an activity at progressively higher levels of challenge". [4]

It appeared to me that in the IT-class at Keio Yochisha and at the "kids on campus" scheme at Saitama University, as well as in the LEC

afternoon classes[5] in Jiyugaoka and Kichijoji, the students often had periods of flow.

The picture below shows such a flow situation – a very concentrated group of students, deeply absorbed in their robot construction experiments.

Usually, if you want to find out if people are actually in flow in a certain situation, a method to use is simply to ask them afterwards. But in this case I didn't interview the students – how then to determine if they were actually in flow?

Project work learning, characterized by high levels of student influence and self-direction are much more likely to produce flow-experiences.

Well, a good indicator is that when I ask kids anywhere whether they were in flow at situations like the one shown on the picture above, they almost always confirm that they were.

Also, my own research conducted at schools in Scandinavia (see articles on this at www.legolearning.net) – as well as the research conducted by , for example,. Prof. Mihaly Csikszentmihalyi (Claremont Graduate University) and Prof. Kevin Rathunde (Utah University) – show that periods of such project work learning, characterized by high levels of student interest, influence and self-direction combined with flexible work and study methods, are much more likely to produce flow-experiences than traditional teaching where all the pupils sit in the classroom, listening to the teacher most of the time, only interrupted by individual work on class assignments from time to time.

Almost all the pupils I have interviewed, at Scandinavian schools, report "school-flow" in connection with periods dominated by such "project work learning" – or, alternatively in more traditional learning settings in normal classes, the pupils report flow experiences during lessons with practical and /or creative subjects like art, music, computing or gymnastics. It should be noted, however, that flow can also occur during long periods of traditional teacher-dominated classroom teaching – in that case, the children often attribute their flow states to the especially engaging skills of the individual teacher.

Flow can also occur during long periods of traditional teacher-dominated classroom teaching, but the children often attribute this to the skills of the individual teacher.

Action competence

Another more general outcome of this type of learning environment, could be described as "action competence"; a construct that deals with achieving "deep" knowledge, going beyond mere reproduction and memorizing. A concept that has "wider" learning perspectives, involving the development of competencies like creativity, innovation and an expanded understanding of problems (here technical / scientific), their causes, effects and solutions.

Thus "action competence" can be seen as a core competence for the future, where individual and group innovation and creativity will be essential for institutions, companies and whole societies as a way of solving ever-more complex problems, implementing necessary adjustments, catching up and developing in a world of rapid change, constantly emerging new, unforeseen problems and technological advances.

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According to Bjarne Bruun Jensen from the Danish University of Education[6], action competence has four dimensions that illustrate different perspectives of the notion.

The four dimensions are:

1. **Effect knowledge**. What kind of problem could occur if I do this wrong? Knowledge of effects.
2. **Cause knowledge**. Why do we have this problem? Knowledge about causes.
3. **Change or solution knowledge**. How do we solve this problem or change the conditions that caused it?
4. **Vision knowledge**. Could there be alternative solutions?

The four dimensions of action competence as seen at Keio Yochisha Elementary School, “Kids on Campus” scheme at Saitama University, and in LEC afternoon classes in Tokyo:

1. **First dimension: Effect Knowledge.** This dimension deals with *basic knowledge* of e.g. scientific, mathematical or logical problems. This type of knowledge can, for example, be about the *consequences* of adding small wheels to a large robot.

2. **Second dimension: Cause Knowledge.** Deals with the *cause dimension of problems*. Being able to *associate problems with hypothetical factors behind them*. What contributes to the fact that this robot turns left when it should have turned right?

3. **Third dimension: Solution Knowledge.** This dimension deals with knowledge about how to *control or solve a problem* – either directly by e.g. “adding an extra brick” or indirectly by changing the factors that caused the problem, like “reconstructing the whole original”. This dimension also includes knowledge about how to cooperate with others – or otherwise get assistance for your problems – a kind of social dimension.

4. **Fourth dimension: Vision Knowledge**. Where do I /we want to go now? Could there be other / alternative / better solutions? Have I got new ideas, developed in my mind after solving the problem this way? The 4th dimension deals with the necessity of developing one’s own visions and creative thought. This dimension includes fantasy and imaginative skills.

Flow conditions in Jiyugaoka Lego Education Center[7]

On the same afternoon as the 5th & 6th graders gathered at the Keio Yochisha Elementary, Tokyo, “somewhere else in town” other afternoon sessions begin at Jiyugaoka and Kichijouji Lego Education Centers (LEC’s). In different groups according to age (ranging from 3-14 years), the children engage in activities similar to the ones described at the Keio Yochisha, adjusted of course to age or experience levels. Periods of almost free play are more frequent here.

Especially at Jiyuugaoka, there are many classes for the preschoolers aged 3-6 years. Here, you see mothers engage in the activities as well – they are even encouraged to do so when they come to pick up their kids. So communication about the activities take place at many levels:

Teaching at the LEGO Education Center's is structured around a 'global science curriculum' that has in-built evaluation of each child's cognitive & social development.

- child-child
- child-teacher
- child-parent
- parent-parent
- parent-teacher
- teacher-teacher

In spite of the seemingly many periods of "almost free play" and "playful learning activities", all activities & teaching at the LEC's are organised and structured according to the Lego Educational Division global science curriculum that has in-built evaluation & documentation of each child's cognitive & social development.

Most activities include, one way or the other, the use of computers in an interesting, interactive way – combing software like "Robolab" and "My make believe Castle", concrete construction materials / toys, and discussions. The university student teachers do a very good job, balancing activities between:

- instruction
- discussion
- structured construction play
- experimentation

- free play
- evaluation

As shown on the picture above, teachers don't hesitate to sit on the floor with the kids – or otherwise engage in even-levelled teacher-pupil communication – something which is still not very common in Japan, as the teacher role is generally more authoritarian.

Also at the LEC's, Csikszentmihalyi's general flow-conditions were often found.

General conditions for generating flow in preschool and primary education:

1. **skills and challenges have to match –** which often requires flexible learning environments

2. **feed back:** the learner needs to know how well he or she is doing. The feedback can be embedded in the activities themselves or supplied by someone else – e.g. a teacher or another pupil.

3. **clear goals:** the aim of the activities must be explicit and known to the learner

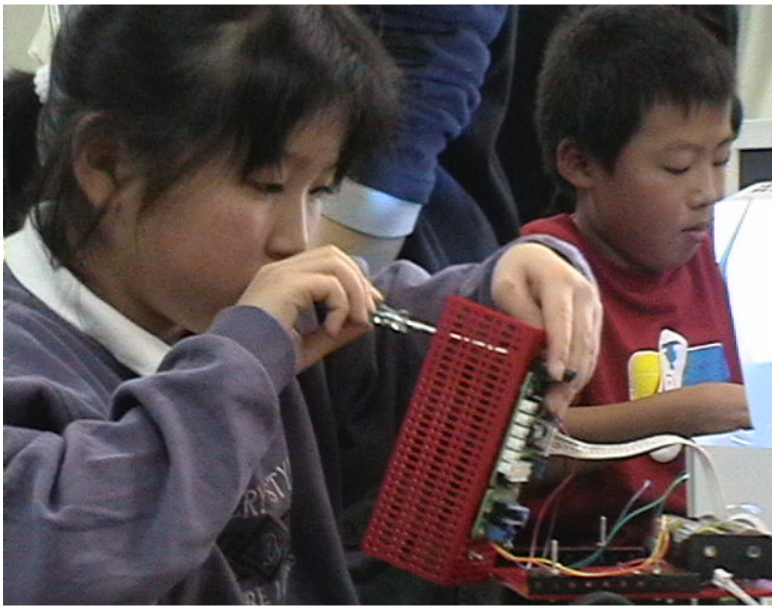
4. **frames and conditions for the activities / learning processes must be clear too.** The learner has to know precisely what he is allowed to do and what he's not.

5. **intrinsic motivation:** it helps if the learner feels motivated from within.

6. **individual influence on the learning processes:** can be helpful too.

7. **reducing disturbing elements:** disturbances like e.g. bullying should be avoided.

8. **possibilities for physical motion:** children this age can't sit completely still for long. It's natural for them to move around and use their bodies from time to time.



Conclusion

It indeed looks like a very worthwhile, inspiring and new way of organising learning environments is being developing at the schools mentioned in this article. In these environments, traditional curriculum goals and standards are met and honoured without the pitfalls of boredom, anxiety and / or performance pressure that you see in many other learning environments – not just for kids, but really for everyone learning. And perhaps, even more importantly, this way of organising and structuring education also enhances "flow", "creative thought", "collaboration" and "action competence" – all crucial, not just for individuals but also for institutions, companies and whole societies, to prosper and develop in the 21st Century. Unfortunately, these

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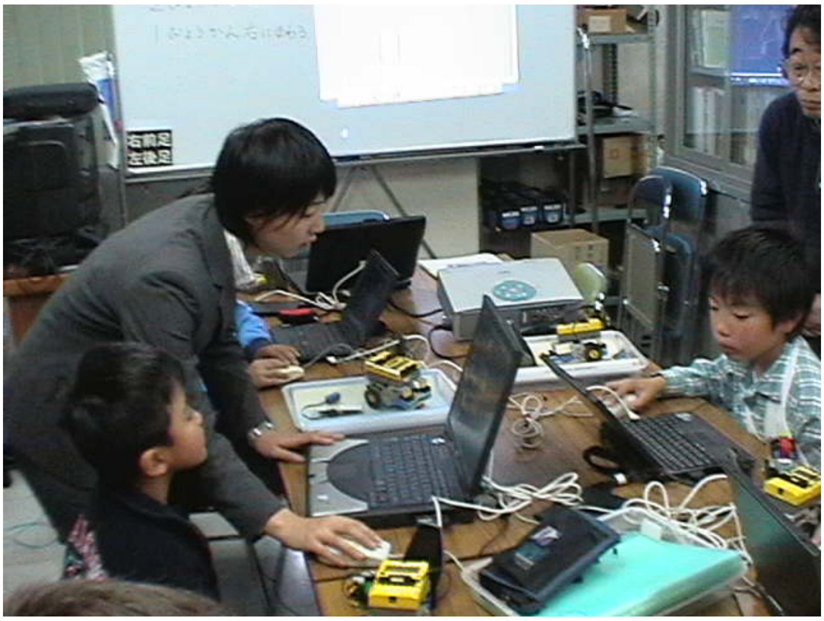
competencies are rarely associated with normal learning environments. But inspiration for change can certainly be found in Tokyo.



Please note: Due to strict laws in Japan concerning the publishing of images of children on the Internet, the re-use of this article and its pictures is strictly prohibited unless it is being used for academic or teaching purposes.